



## NUTRITIVE VALUE OF SOME CHICKEN MEAT PRODUCTS

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### ABSTRACT

A total of 60 random samples of processed chicken meat products were collected from different supermarkets located in Kalyobia governorate. The examined samples were represented by half cooked Chicken Fingers, Chicken Pane, Cordon Bleu, , Chicken Fillet (15 of each product) to evaluate their nutritive value. The result showed that the mean values of moisture%, protein %,fat%, carbohydrates % and ash% in the examined samples of halfcooked Chicken Fingers, Chicken Pane, Chicken Fillets and Cordon Bleu were  $61.84 \pm 0.22\%$ ,  $14.78 \pm 0.13\%$ ,  $6.57 \pm 0.14\%$ ,  $10.13 \pm 0.09$  and  $3.46 \pm 0.06\%$  for Chicken Fingers,  $61.09 \pm 0.17\%$ ,  $15.10 \pm 0.18\%$ ,  $6.26 \pm 0.09\%$ ,  $9.92 \pm 0.12$  and  $3.18 \pm 0.09\%$  for Chicken Pane,  $59.67 \pm 0.19\%$ ,  $15.36 \pm 0.15\%$ ,  $12.80 \pm 0.11\%$ ,  $9.58 \pm 0.08$  and  $1.77 \pm 0.04\%$  for Chicken Fillets and  $60.25 \pm 0.16\%$ ,  $14.92 \pm 0.16\%$ ,  $13.24 \pm 0.12\%$ ,  $9.69 \pm 0.10$  and  $1.39 \pm 0.07\%$  for Cordon Bleu ,respectively.

**KEY WORDS:** Ash, Chicken meat products, Fat, Moisture, Protein.

(BVMJ-24(1): 238-245, 2013)

## 1. INTRODUCTION

Poultry and poultry products are good sources of animal protein of high biological value, which contains all the essential amino acids required for human nutrition, besides that they contain higher proportion of unsaturated fatty acids and less cholesterol especially when skin is removed [21].

Poultry meat are good source of protein of high biological value which contain most of essential amino acids besides many vitamins and minerals which are important for human body , about 20-23% protein and 4.7 to 6.4 % Fats and the moisture content 60-80 % [22].

The chemical composition of each chicken meat product is greatly varied from one product to another as it contains different kinds of tissues and Sometimes a

mixture of non-nitrogenous substances [4]. The aim of the current study is to determine the nutritive value and chemical composition of chicken meat products and to ensure the compliance of such products with their legal and compositional standards written on their label.

## 2. MATERIALS AND METHODS

### 2.1. Samples

A total of 60 random samples of processed chicken meat products represented by half cooked Chicken Fingers, Chicken Pane, Cordon Bleu and Chicken Fillet (15 of each product) were collected from different supermarkets in Kalyobia governorate to evaluate their nutritive value.

Sampling: Chicken fingers and chicken pane have the same ingredient according to it is label: Bone less chicken breast- bread crumbs- wheat flour- table salt- spices- phosphate salt- vegetable oil. Ingredient of Cordon bleu according to it is label: bone less chicken breast- cheese- bread crumbs- wheat flour- table salt- spices- phosphate salt- vegetable oil.

Ingredient of Chicken fillet according to it is label: bone less chicken breast- bread crumbs- wheat flour- table salt- spices- phosphate salt- vegetable oil.

Each sample was weighed 300g and transferred in an insulated icebox to the laboratory. All collected samples were subjected to the following examinations:

#### 2.2. *Determination of moisture content AOAC [3]:*

The samples were ground, well mixed, then weighted aluminum dish and put in it two gm of sample, putted in oven at 125°C for 2-4 hrs, putted in oven for 125°C for 2-4 hrs., sample cooled to room temperature (30min.) in desiccating unit, weighted sample repeatedly till obtain two successive constant weight.

Moisture % = (loss in weight / Weight of samples) X 100

#### 2.3. *Determination of protein content:*

The Kjeldahl method was carried out according to the technique recommended by AOAC [3], two g of samples were placed in digestion flask, added 50 g of (K<sub>2</sub>SO<sub>4</sub>), 0.5 g of metallic mercury and 40ml of (H<sub>2</sub>SO<sub>4</sub>), The flask was placed in an inclined position, gently heated until frothing ceases, then boiled until solution was cleared for 30 minutes. Then cooled below 25°C and 200 ml distilled water were added, 25 ml of sodium thiosulphate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) were added to prevent pumping, then sufficient amount of 50% NaOH (90ml) was added without shaking.

Calculation: Nitrogen % = [(ml of acid X N of acid) – (ml of NaOH X N of NaOH) / (Weight of sample)] X 1.4007

Protein % = Nitrogen % X 6.22

#### 2.4. *Determination of fat content:*

Using Soxhlet technique recommended by AOAC [3]

Five grams of heat-dried samples were placed in Soxhlet extractor connected with condenser, Soxhlet flask containing petroleum ether was connected to the extractor and electrically heated, extraction was continued for 6 hrs, petroleum ether was evaporated in boiling water bath and the flask was dried in oven at 100°C for 30 minutes, then cooled in desiccators and weighted.

Calculation:

Fat % = weight of the flask before and after extraction.

#### 2.5. *Estimation of ash content AOAC [3]:*

Five grams of sample were placed in a dry, clean and weighted crucible, placed in muffle furnace at 550-600°C for 6-8 hr. with gradual increase of temperature, Cool in desiccators and weighted.

Calculation:

Ash % = [weight remain (g)/weight of sample taken (g)] X 100.

#### 2.6. *Estimation of carbohydrate content AOAC [3]*

Total carbohydrate content was calculated by the following formula:

100 - (Weight in grams [protein + fat + water + ash + alcohol] in 100 g of food).

#### 2.7. *Statistical Analysis*

Results were statistically evaluated according to previous method [4].

### 3. RESULTS AND DISCUSSION

#### 3.1. Moisture %

It is evident from the results recorded in table (1) that the mean value of moisture (%) in the examined half cooked Chicken Fingers , Chicken Pane , Chicken Fillets and Cordon Bleu were  $61.84 \pm 0.22$  % ,  $61.09 \pm 0.17$  % ,  $59.67 \pm 0.19$  % and  $60.25 \pm 0.16$  % . all the examined samples were acceptable according to EOS [6].

The Obtained results were nearly similar to those obtained by Innawong et al. [10] 61.08 % and El-Tahan et al. [5] 58.6 to 61.3 % . While lower results were obtained

by Modi et al. [17]  $48.7 \pm 1.74$  % and Maamoon- Amany [14]  $45.46 \pm 1.2$  % . However, higher findings were obtained by Hidalgo et al. [9] 67.4 % Qoboory [18] 65.34 % and Al-Dughaym and Altabari [1] 61.65 to 69.99 % .

The variation in the moisture contents between the examined samples could be attributed to their formulation and cooking method.

The increase in frying oil temperature increased the moisture loss, crust oil uptake and hardened the texture [10].

Table 1: Statistical analytical results of moisture content (%) in the examined samples of chicken meat products (n=15).

Products	Min.	Max.	Mean $\pm$ S.E*	label	EOS
Chicken fingers	60.2	63.3	$61.84 \pm 0.22$	-	About 60%
Chicken pane	59.8	62.8	$61.09 \pm 0.17$	-	About 60%
Chicken fillets	58.3	61.1	$59.67 \pm 0.19$	-	About 60%
Cordon bleu	58.7	61.2	$60.25 \pm 0.16$	-	About 60%

S.E\* = standard error of mean.

#### 3.2. Protein %:

Protein content of chicken meat products is of high biological value, they can supply the human being by all essential and non-essential amino acids [19].

Results achieved in Table (2) declared that the mean values of protein content(%) in the examined samples of chicken meat products in half cooked form were  $14.78 \pm 0.13$  % for Chicken Fingers ,  $15.10 \pm 0.18$  % for Chicken Pane,  $15.36 \pm 0.15$  % for Chicken Fillets and  $14.92 \pm 0.16$  % %

for Cordon Bleu. all examined the samples were acceptable according to EOS.

The current results agree with those recorded for protein by Lukman et al. [13] 12.52 to 16.62 % , Al-Dughaym and Altabari [1] 12.58 to 14.62 % and Maamoon-Amani [14]  $12.03 \pm 0.5$  % . Lower results were obtained by Smith [23] 10.1 and 5.34 % . However, higher result were obtained by Qoboory [18] 16.26 and 20.53 % , Jackson et al. [11] 22 to 25 % and Fathy-Eman [7] 16.9 to 23.3 % .

Table 2: Statistical analytical results of protein content (%) in the examined samples of chicken meat products (n=15).

Products	Min.	Max.	Mean $\pm$ S.E*	label	EOS
Chicken fingers	13.9	15.6	14.78 $\pm$ 0.13	15%	About 12%
Chicken pane	14.3	16.0	15.10 $\pm$ 0.18	15%	About 12%
Chicken fillets	14.7	15.9	15.36 $\pm$ 0.15	15%	About 15%
Cordon bleu	14.3	15.7	14.92 $\pm$ 0.16	15%	About 12%

S.E\* = standard error of mean

### 3.3. Fat %:

Results achieved in table (3) declared that the mean values of fat content (%) in the examined samples of half cooked Chicken Fingers , Chicken Pane , Chicken Fillets and Cordon Bleu were 6.57 $\pm$ 0.14, 6.26 $\pm$ 0.09, 12.80 $\pm$ 0.11 and 13.24 $\pm$ 0.12, respectively. All the examined samples were acceptable according to EOS and label.

Nearly similar results were obtained by Ali and Rasool [2] 10.06-12.28%, Qoboory

[18] 9.91 to 13.81% and Al-Dughaym and altabari [1] 6.4 to 6.6%. While, lower results were recorded by Jackson et al. [11] 5.2-2.8%, and Fathy-Eman [7] 1.6 to 6.3%.

However, higher findings were obtained by Lukman et al. [13] 18.14-25% and Maamon Amany [14] 21.2 $\pm$ 0.4% and 18.81 $\pm$ 0.7%.

Oil absorption occurs as moisture is removed from the food during frying and the amount of oil uptake has been shown to be directly proportional to the amount of moisture loss [20].

Table 3: Statistical analytical results of fat content (%) in the examined samples of chicken meat products (n=15).

Products	Min.	Max.	Mean $\pm$ S.E*	label	EOS
Chicken fingers	5.9	7.3	6.57 $\pm$ 0.14	6.2%	About 15%
Chicken pane	5.8	6.8	6.26 $\pm$ 0.09	6.2%	About 15%
Chicken fillets	12.1	13.5	12.80 $\pm$ 0.11	12%	About 13%
Cordon bleu	12.4	14.0	13.24 $\pm$ 0.12	13%	About 15%

S.E\* = standard error of mean

### 3.4. Ash content:

The added salts in curing play a role in tenderization due to increase water holding capacity [12].

It is evident from the results recorded in table (4) that the mean values of ash content in the examined half cooked Chicken Fingers, Chicken Pane, Chicken Fillets and Cordon Bleu were 3.46 $\pm$ 0.06, 3.18  $\pm$  0.09, 1.77  $\pm$  0.04 and 1.39  $\pm$  0.07, respectively.

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The current results of ash content were nearly similar previous studies [1] 2.4%, [14]  $2.2 \pm 0.09$  and  $2.5 \pm 0.06\%$  and [7] 1.5 to 4.9%. While higher results were recorded

by Maria et al. [15] 4.93%. However, lower results were recorded by Moawad [16] 1.03 and 0.18%.

Table 4: Statistical analytical results of ash content (%) in the examined samples of chicken meat products (n=15)

Products	Min	Max	Mean $\pm$ S.E*
Chicken Fingers	2.6	4.3	$3.46 \pm 0.06$
Chicken Pane	2.2	4.1	$3.18 \pm 0.09$
Chicken Fillets	1.1	2.3	$1.77 \pm 0.04$
Cordon Bleu	0.8	2.1	$1.39 \pm 0.07$

S.E\* = standard error of mean

### 3.5. Carbohydrates content:

It is evident from the results recorded in table (5) that the mean values of carbohydrates content in the examined half cooked Chicken Fingers, Chicken Pane, Chicken Fillets and Cordon Bleu were  $10.13 \pm 0.09$ ,  $9.92 \pm 0.12$ ,  $9.58 \pm 0.08$  and  $9.69 \pm 0.10$ , respectively. All the examined samples were acceptable according to EOS.

Higher results were obtained by Maamon-Amany [14]  $14.83 \pm 0.05\%$  and  $15.6 \pm 0.9\%$ .

The increase in carbohydrate content in chicken meat products nowadays may be attributed to the increase in starch content as extender to substitute raw meat in manufacturing chicken meat products and the main reason behind this is the manufacture plans to reduce the cost and increase the marginal profit [13].

Table 5: Statistical analytical results of carbohydrate content (%) in the examined samples of chicken meat products (n=15).

Products	Min.	Max.	Mean $\pm$ S.E*	Label	EOS
Chicken fingers	9.5	10.6	$10.13 \pm 0.09$	9.8%	About 12%
Chicken pane	9.3	10.5	$9.92 \pm 0.12$	9.8%	About 12%
Chicken fillets	9.1	10.1	$9.58 \pm 0.08$	9.6%	About 10%
Cordon bleu	9.1	10.2	$9.69 \pm 0.10$	9.6%	About 12%

S.E\* = standard error of mean

Finally, the variation in nutritional composition (moisture, protein, fat, carbohydrates and ash) between the examined samples of chicken meat products could be attributed to the variation

in their formulation and cooking methods. As, they contain different kinds of tissues and sometimes a mixture of non-nitrogenous substances [4].

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## القيمة الغذائية لبعض منتجات لحوم الدواجن

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### الملخص العربي

أجريت الدراسة لتقييم جودة منتجات الدواجن من الناحية الغذائية وللتأكد ان هذه المنتجات مطابقة للقيم الغذائية المسموح بها والقيم المتواجدة على علب التصنيع لذا قامت الدراسة على فحص عدد (60) عينة في كلا من التشكين فنجرز ، البانية ، الفيلية والكوردون بلو النصف مطهية بواقع (15) عينة من كل صنف والتي تم جمعها من محلات الاغذية المختلفة بمحافظة القليوبية وذلك لدراسة الحالة الغذائية والكيميائية للمنتجات، وقد أسفرت هذه الدراسة على النتائج التالية كان متوسط النسب المئوية للرطوبة، البروتين ، الدهون و الرماد هي  $61.84 \pm 0.22$  ،  $14.78 \pm 0.13$  ،  $6.57 \pm 0.14$  و  $3.46 \pm 0.06$  في التشكين فنجرز النصف مطهية على التوالي ،  $61.09 \pm 0.17$  ،  $15.10 \pm 0.018$  ،  $6.26 \pm 0.09$  و  $3.18 \pm 0.09$  في البانية النصف مطهى على التوالي ،  $59.67 \pm 0.19$  ،  $15.36 \pm 0.15$  ،  $12.8 \pm 0.11$  و  $1.77 \pm 0.04$  في فلية الدجاج النصف مطهى على التوالي ،  $60.25 \pm 0.16$  ،  $14.92 \pm 0.16$  ،  $13.24 \pm 0.12$  و  $1.39 \pm 0.07$  في الكوردون بلو النصف مطهى وقد أسفرت الدراسة عن أن هذه المنتجات مطابقة للقيم الغذائية المسموح بها والقيم المتواجدة على علب التصنيع.

(مجلة بنها للعلوم الطبية البيطرية: عدد 24 (1)، يونيو 2013: 240-247)